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THE STIMULATIVE AND CORRELATIVE VALUE OF A WELL-BALANCED COURSE IN COMMERCE AND INDUSTRY—*Concluded*

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IV. THE STIMULATIVE VALUE OF THE PROPOSED COURSE

The inherent stimulative features of a given course are to be judged by its probable power to create an inquiring mental attitude which will be satisfied only by further seeking after light or by the solution of problems; to awaken and maintain mental activity; or so to inspire and elevate the individual that he no longer is satisfied to live on a former level or in a previous mental or physical environment.

The following appear to be some of the stimulative elements of the course:

1. Pupils will approach this subject in anticipation of having many questions answered in which they are interested because the subject is connected with business life, about which their minds are already inquiring. This expectant attitude will prove a wonderful asset to the teacher of this subject. Professor Hanus touches upon this point in a forceful fashion when he says:

All teachers are aware that the only way to arouse the minds of some pupils lies through the "practical studies." Some minds are for a time quite inaccessible to the intellectual pursuits as such. To such pupils intellectual

pursuits acquire interest and significance only as they are seen to be associated with trade, manufacture, or commerce. Mathematics, natural science, and foreign languages acquire significance for many minds only when it becomes clear that these subjects underlie important phases of industrial or commercial life. Undertaken at first because of an interest with which they are associated, these subjects acquire, under wise guidance, a significance that belongs to them as such, and the way to general culture lies, for a time at least, through manual and commercial training.¹

2. Pupils will enter this course without fear of its difficulties, as it is not in a field wholly unknown to them; it calls for facts of which they already have considerable knowledge, as in geography, nature-study, history, etc. This means confidence, and confident expectation of success is highly stimulative.

3. The course awakens keen interest in commercial problems because much of the material which is the basis of study lies close at hand, and pupils need but to have their attention properly directed in order that they may see things all about them which have a commercial bearing and the causes or relations of which they desire to know. Goode says:

The student properly trained in it [commercial geography] will have his eyes opened to the multitude of great problems of modern society and will be well started in the way to know the forces involved and the methods of solution of these problems. Above all, he will be impressed with the idea that things do not happen—they are caused—and that often social and economic problems may be solved by study and thought.²

4. Through the necessity of seeking material for use as clippings the habit of reading the newspapers and magazines is inculcated, with the result that the pupils find new food for thought, and this uncovering of new information makes them feel like discoverers of truth, and their interest in the developments of commercial activities is enhanced. DeGarmo advises "that the student be placed in the attitude of a discoverer; that he be set to finding out things for himself."³

5. The investigation which is necessary in order to write a formal paper on the work of a bureau of the national government,

¹ Paul H. Hanus, *The Modern School*, p. 25.

² J. Paul Goode, *Journal of Geography*, December, 1905, p. 432.

³ Charles DeGarmo, *Principles of Secondary Education*, chap. viii.

as well as the study of our nation's position in agriculture, manufacture, mining, transportation, and invention, leads to a feeling of pride in our country, her people, and their wonderful achievements.

6. The comments on clippings, the written and oral reports on visits and investigations, offer an unusual opportunity for pupils to express themselves on new subjects about which they are gaining knowledge and for which they almost invariably feel an enthusiasm. That "knowledge is power" is peculiarly applicable here, for a little knowledge helps to develop power. Ex-President Eliot, of Harvard, has said: "The power to understand rightly and to use critically the mother-tongue is the flower of all education." There can be no flower without a bud, and the language work which is possible in this portion of the work may well lead to the production of a flower.

7. There is a peculiar and lasting stimulation when pupils discover for themselves that their only wise course is to proceed with their secondary-school education until its completion. Frequently when classes are asked what impressions they gathered or what lessons they learned in visits to leading manufacturing establishments, they make reference to the large numbers of poorly paid, monotonously employed people whom they have seen at their work. Thus they demonstrate that they have discovered that the reason is clearly lack of education or of skill of an uncommon type.

8. The money-making and power-conferring possibilities of business, which are everywhere apparent to one who observes, naturally get into the minds of many pupils, and thus they may become permanently possessed of an ambition which will ultimately carry them to opulence or usefulness or the gratification of accomplishment.

9. Perhaps the crowning stimulative element of this course is the consciousness which students have that they possess a body of related facts, know the causes which underlie this knowledge, and would know where to seek for further or for exhaustive knowledge on a given topic should occasion arise. The fact that they could secure fairly complete information regarding processes of manufacture of most materials in the United States, with discriminating

statistics relating to the same, or to agriculture, mining, transportation, population, etc., from publications with which they have become familiar is an invaluable source of strength.¹

V. THE PEDAGOGICAL VALUE OF THE PROPOSED COURSE

DeGarmo² asserts that facts are acquired by authority, by observation, and by experiment. He discusses the merits and demerits of each. On the basis of this classification the course appears to be well balanced, since many of its facts are acquired in each of these ways.

By authority.—While it is true that knowledge acquired in this way begets a passive attitude of mind, and its ease of acquirement interferes with a sense of its value, it is to be noted that if an individual is to be progressive in knowledge, or well educated, he must accept on authority of others much of his knowledge. The limitations of time and the magnitude of the field of knowledge do not permit each individual by personal observation or experiment to acquire the knowledge which others have worked out. It is, furthermore, beneficial for him to feel that the efforts, opinions, and knowledge of others are worth while and should receive recognition from him. The study of the textbook, the preparation for writing of comments on clippings, and the special talks by the teacher on unfamiliar industries, all furnish a broad field for acquiring facts by authority. Pupils should be taught and urged to weigh all facts so acquired as to their probable truth in the light of reason and the reliability of the source of information.

By observation.—This method has the advantage of yielding a greater probability of truth and a greater vividness of impression. Objects are identified by their characteristic qualities or actions, these first impressions are verified, and the resultant knowledge of classes of things is stored away for possible further additions of knowledge, and further observation often leads to the storing-up of knowledge in general terms. The keeping of the clipping-book, the visits to factories and transportation plants,

¹ Mr. Anderson continues his paper by showing how the course "commerce and industry" correlates with all the other subjects of the high-school curriculum. Lack of space forbids the publication of his entire paper.

² Charles DeGarmo, *op. cit.*, chap. i.

the study of specimens and the plant collection all offer fine fields for acquiring knowledge by observation. The interest stimulated by this observation while in school will prove most valuable, as the habit of observation will naturally continue and lead to a progressive acquirement of knowledge through observation.

By experiment.—Experiment is the act of observing when the observer controls some of the conditions which make experiment possible; or, as Huxley asserts, it is “artificial observation.” There is not much in this course which yields to experimentation, yet it is not entirely lacking in possibilities in this method of acquiring facts. The specimen collection and the plant collection both provide opportunity for experiment. In some cases, specimens such as the collection contains may be taken and the results achieved by manufacturing crudely approximated. As instances the following may be mentioned:

Vegetable kingdom: A few pounds of crude beets or sugar cane may be secured. These can be cut fine, boiled to liquefy the sugar content, filtered through a bag to remove mechanical impurities, decolorized through bone charcoal, and boiled down to crystallize. The crystals must be separated from the syrup for refined sugar.

Animal kingdom: The green hide of a lamb or a portion of a calfskin might be secured from an abattoir, limed to remove the hair, tanned in a vegetable or mineral tan, and then curried to soften and finish.

Mineral kingdom: A thin disk of lead might be made, placed in a vessel over a small amount of acetic acid, and this combination placed in a closed box, the bottom of which has been filled with tan-bark. The fermenting bark will give off carbonic acid gas, and the two gases acting on the lead disk for about one hundred days will corrode it and turn it into a white solid, which can be ground and mixed with linseed oil to make white paint.

These few experiments are typical and will require time and careful observation from the teacher. After they have been successfully performed, the teacher can conduct them with the knowledge of the class.

The plant collection will yield a broader field for experiments and will prove much more simple.

Barley can be grown and the mature grain can be moistened to start germination; germination being arrested by breaking off the sprouts, malted barley is the result.

Crude sugar syrup can be secured from sugar beets by slicing and soaking in water and boiling down the beets.

Oils can be expressed from the seeds of the oil-producing plants—cotton, flax, hemp, sunflower, rape, peanut, and castor oil bean.

Fibers can be secured from the cotton, flax, hemp, and ramie plants.

Tobacco can be raised in several varieties, dried, and their differences observed and tested.

If coffee and tea can be raised, roasting and curing might be tried.

These are a few of the most likely experiments that are possible. No claims as to their outcome are made. That would depend on the experimenter. The teacher would need much patience, some apparatus, a knowledge of chemistry, and a familiarity with the simpler processes in use by the manufacturers.

Judged from the standpoint of psychology, this course would compare favorably with many very valuable subjects. Judgment and reason are developed to a good degree in the study of the explanation (physical, political, and economic) of the geographic division of labor—the localization of industry; discrimination is the keynote of the work on the clipping-books; imagination is strengthened through the use of specimens from all parts of the world and from so many varied industries; emotion is awakened through contemplation of the greatness of the United States in the leading lines of human effort and human needs; and the will is strengthened in the doing of tasks at stated times on the pupils' own responsibility without being watched by the teacher, as in seeking clippings and writing comments regularly; while that most important trait, initiative, is developed to a marked degree through the visits and formal reports, and the investigations in the departmental work.